RTCA Special Committee 186, Working Group 3

ADS-B 1090 MOPS, Revision A

Meeting #6

Proposed Changes to Section 2.2 and 2.4 required by the addition of a Version Number

Presented by Gary Furr

SUMMARY
In Working Paper 1090-WP-3-01 it was proposed that a 4-bit subfield be added to the Aircraft Operational Status Message to indicate the Version Number to which the 1090 MHz system was conformant. In response to Action Item 3-2, this paper attempts to identify those places in Sections 2.2 and 2.4 that will be required to change as a specific result of the addition of the proposed 4-bit Version Number subfield.

1.0 Background

At Meeting #2 in Melbourne FL, the Working Group agreed to add a Version Number subfield to the Aircraft Operational Status Message. The purpose of this subfield is to define the Version Number of the formats and protocols in use by the transmitting device. A Version Number is required because it is expected that the formats and protocols will evolve with time and more than one version may be in use during the transition period. The receiver uses the Version Number in order to correctly process ADS-B Messages.

In Meeting #3 in Phoenix AZ, in Working Paper 1090-WP-3-01A Vince Orlando proposed that modifications be made to Figure A-12 (Aircraft Operational Status Message definition) to define a 4-bit Version Number, and that a new paragraph be added to Appendix A as A.4.11.11 to define the 4-bit Version Number as follows:

A.4.11.11 Version Number (VN)

This 4-bit (41-44) subfield shall be used to indicate the version number of the formats and protocols in use on the aircraft installation. Encoding of the subfield shall be as shown in Table A-21.

Table A-21: Version Number Encoding

VERSION NUMBER SUBFIELD	
Coding	**Meaning**
0	Conformant to DO-260
1	Conformant to DO-260A
2 to 15	Reserved

It is worth noting that in Working Papers 1090-WP-5-10A and 1090-WP-5-11A, James Maynard proposed reducing the Version number to a 3-bit subfield, assuming that eight (8) versions would be sufficient to sustain the 1090 MHz systems for well into the future before rolling back to version zero (0), which by that time could be redefined if necessary. Jim's proposal was deferred until a later meeting and was not accepted by the Working Group during Meeting #5. Whether the Version Number subfield is a 4-bit field or a 3-bit field does not change the places in the remainder of DO-260 that need to change specifically because of the introduction of the Version Number. The Working Group will be required to make a decision on the size of the Version Number subfield prior to the finalization of text associated with the identified subparagraphs in this Working Paper.

Additionally, the definition of which subparagraphs should be changed or added as a result of the Version Number is a work in process. The Working Group needs to discuss the inclusion of the Version Number in the State Vector and how the Version Number affects the Report Generation function. **I believe that the Version Number will be required in order to establish a Track on a target.** But, with the Version Number only being transmitted in the Aircraft Operational Status Message, I'm not clear on how we guarantee that the Version Number gets picked up because in subparagraph 2.2.3.3.2.6.3 on DO-260 page 108, it states that "(a) The Aircraft Operational Status shall be initiated only when either Capability Class or Operational Mode data is available and valid as a minimum. (b) The Aircraft Operational Status Message shall be broadcast at random intervals that are uniformly distributed over the range of 1.6 to 1.8 seconds relative to the previous Aircraft Operational Status Message for as long as data is available to satisfy the requirements of 'a.' above."

2.0 Proposal

In addition to the definition of the Version Number in Appendix A, Suparagraph A.4.11.11, changes are required in Section 2.2 and 2.4 in order for the Version Number to become part of the specification of the 1090 MHz MOPS, Revision A. I propose that the following changes are required:

1. Addition of the Version Number subfield to Figure 2-10, on DO-260 page 97

2. Re-number existing subparagraph 2.2.3.2.7.3.5 ("Not Assigned Subfield") on DO-260 page 103 to 2.2.3.2.7.3.6

3. Addition of a new subparagraph 2.2.3.2.7.3.5 entitled "**Version Number Subfield in Aircraft Operational Status Messages**" on DO-260 page 103

4. Re-number existing subparagraph 2.4.3.2.7.3.5 ("Verification of Not Assigned Subfield") on DO-260 page 407 to 2.4.3.2.7.3.6, plus editing of the existing text to correct paragraph references.

5. Additional of a new subparagraph 2.4.3.2.7.3.5 entitled "**Verification of the Version Number Subfield in Aircraft Operational Status Messages (subparagraph 2.2.3.2.7.3.5)**" followed by the text required to specify a test procedure to verify the Version Number.

6. Addition of a new subparagraph 2.2.5.1.44 entitled "**Version Number Data**" to be added on DO-260 page 134.

7. Addition of a corresponding new subparagraph 2.4.5.1.44 entitled "**Verification of the Version Number Data (subparagraph 2.2.5.1.44)**" on DO-260 page 450.

8. Addition of the Version Number as Item #27 in the definition of State Vector Data Elements in Table 2-64, DO-260 page 146, and adjustment of the number of total bytes of the SV to accommodate the size of the Version Number.

9. Addition of a new subparagraph 2.2.8.1.29 entitled "**Version Number**" on DO-260 page 164, with supporting text defining the Version Number in the State Vector.

10. Addition of a corresponding new subparagraph 2.4.8.1.29 entitled "**Verification of Version Number Reporting (subparagraph 2.2.8.1.29)**" on DO-260 page 533

11. Possible changes to the Report Assembly Function in subparagraph 2.2.10 as necessary to detail inclusion of the Version Number.